

[54] **CARD-TYPE RADIO RECEIVER HAVING
SLOT ANTENNA INTEGRATED WITH
HOUSING THEREOF**

[75] Inventors: **Toshihiro Mori; Kazuyuki Tsunoda,**
both of Tokyo; **Masayoshi**
Yamashita, Saitama, all of Japan

[73] Assignee: **NEC Corporation, Japan**

[21] Appl. No.: **363,348**

[22] Filed: **Jun. 6, 1989**

Related U.S. Application Data

[63] Continuation of Ser. No. 135,347, Dec. 21, 1987, abandoned.

[30] Foreign Application Priority Data

Dec. 19, 1986 [JP] Japan 61-303398

[51] Int. Cl.⁵ **H01Q 1/24; H04B 1/38**

[52] U.S. Cl. **343/702; 343/767;**
455/89; 455/90

[58] Field of Search 343/700 MS, 702, 718,
343/746, 767, 768; 455/89, 90, 347, 351

[56] References Cited

U.S. PATENT DOCUMENTS

4,625,212 11/1986 Oda et al. 343/702
4,641,366 2/1987 Yokoyama et al. 455/89
4,651,312 3/1987 Honma et al. 343/702

4,701,763 10/1987 Yamamoto et al. 343/702
4,721,962 1/1988 Gorzel 343/702

FOREIGN PATENT DOCUMENTS

0246026 11/1987 European Pat. Off. .
0007204 1/1985 Japan 343/702
0245321 12/1985 Japan 455/351
0023423 1/1986 Japan 455/89
0277803 12/1987 Japan .

Primary Examiner—Rolf Hille

Assistant Examiner—Doris J. Johnson

Attorney, Agent, or Firm—Laff, Whitesel, Conte & Saret

[57]

ABSTRACT

A slot antenna is integrated with and forms part of the housing for a miniature radio receiver having dimensions comparable to the dimensions of a credit card. The antenna is formed by three plates arranged to have a generally U-shaped cross section. One plate is on one side of and is approximately the dimensions of the "credit card" receiver. A second plate is much more narrow and extends along one edge of the other side of the "credit card" receiver in a spaced parallel relationship with the first plate. The third plate extends vertically between the first two plates and along the one edge of the "credit card" receiver. Together, the three plates make up not only the antenna, but also three sides of the housing of the receiver.

22 Claims, 4 Drawing Sheets

